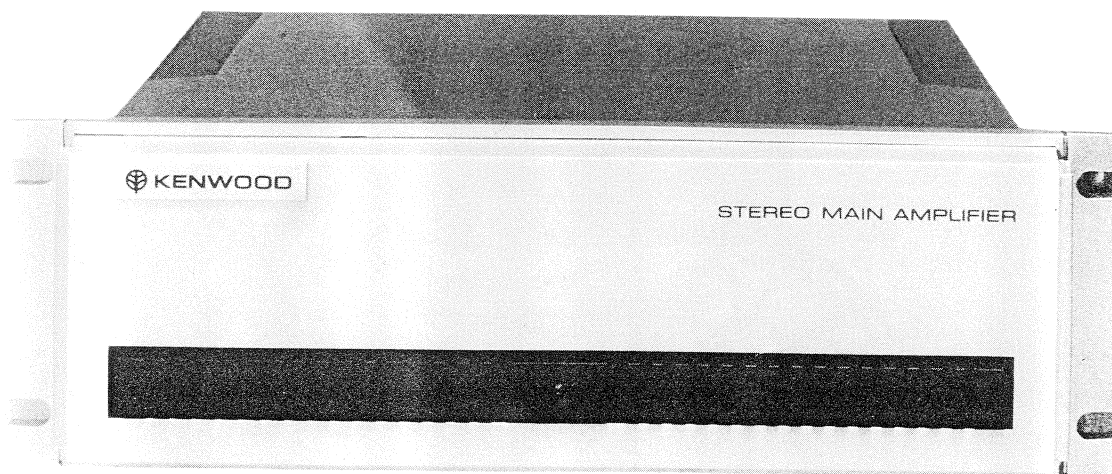


**KENWOOD®**

STEREO FOR YOUR CAR

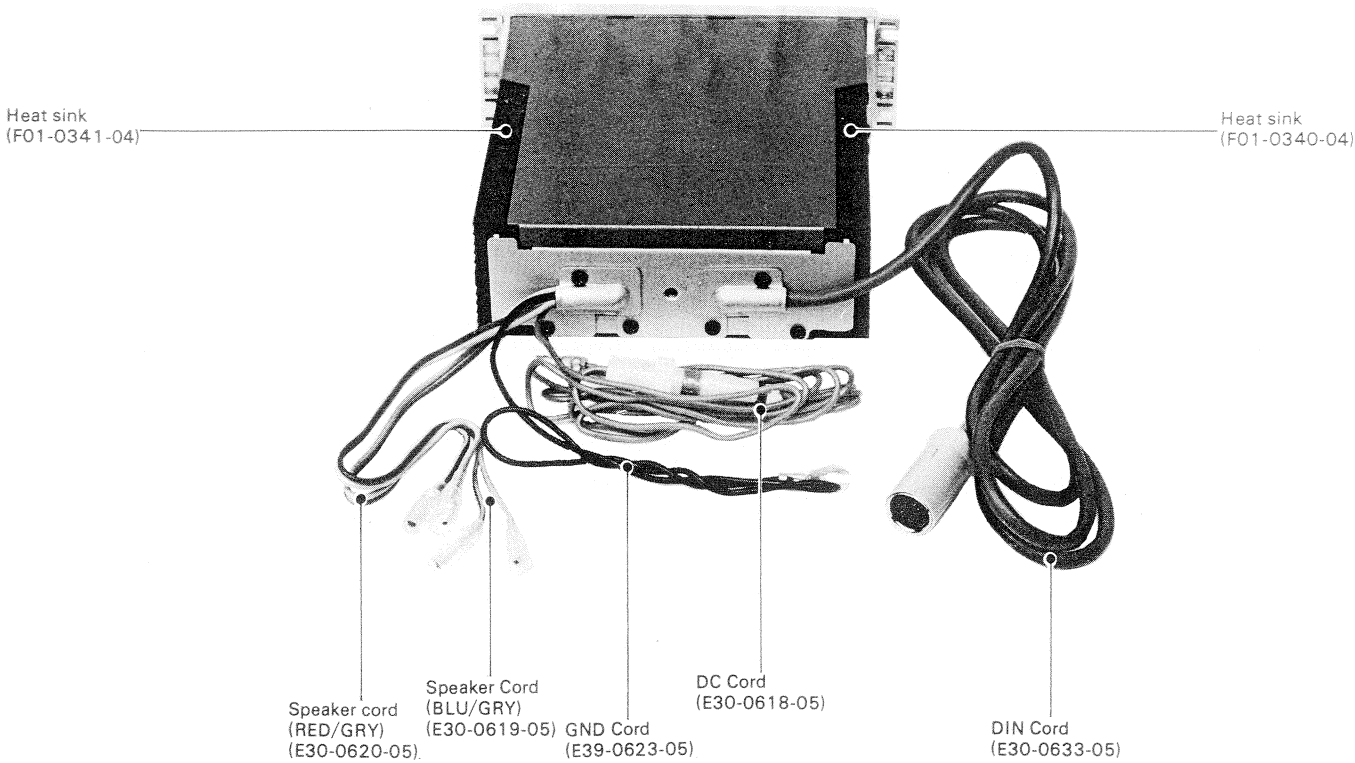
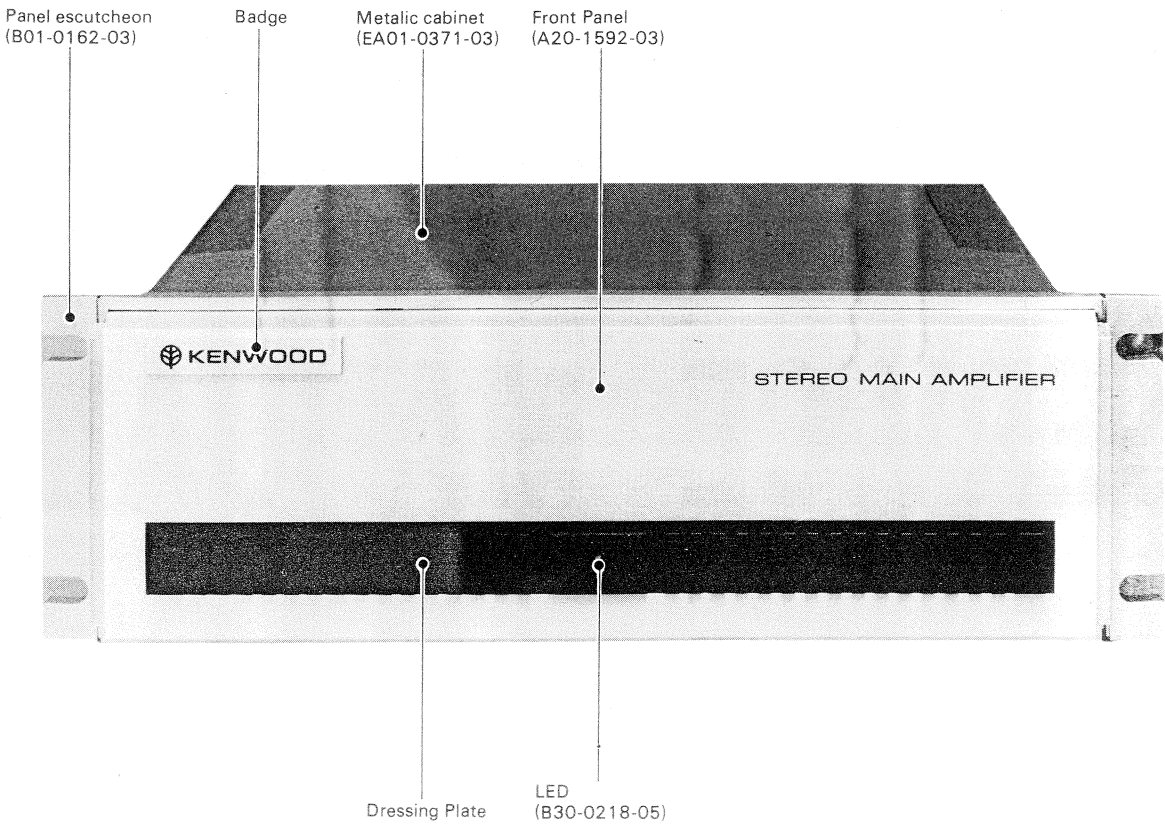
# SERVICE MANUAL

**KAC-727**

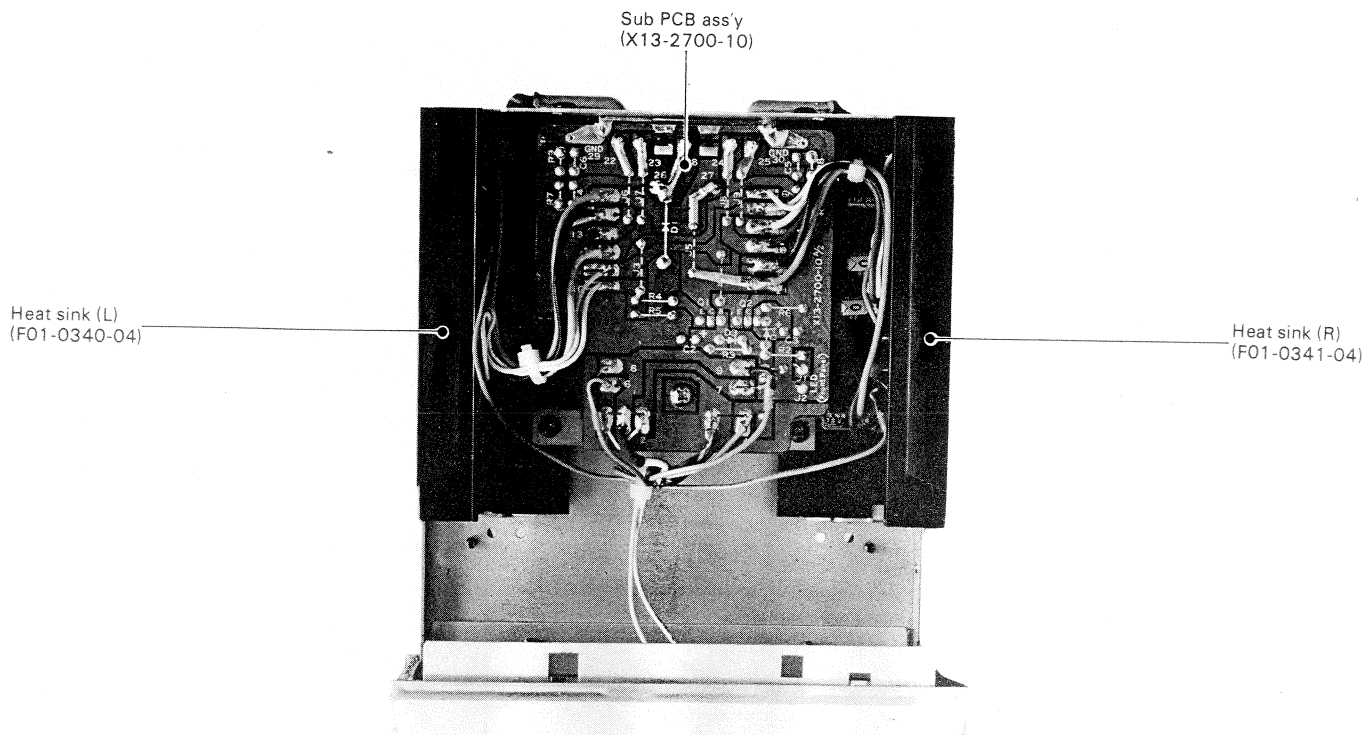


**STEREO MAIN AMPLIFIER**

# EXTERNAL VIEW



## INTERNAL VIEW/DISASSEMBLY FOR REPAIR

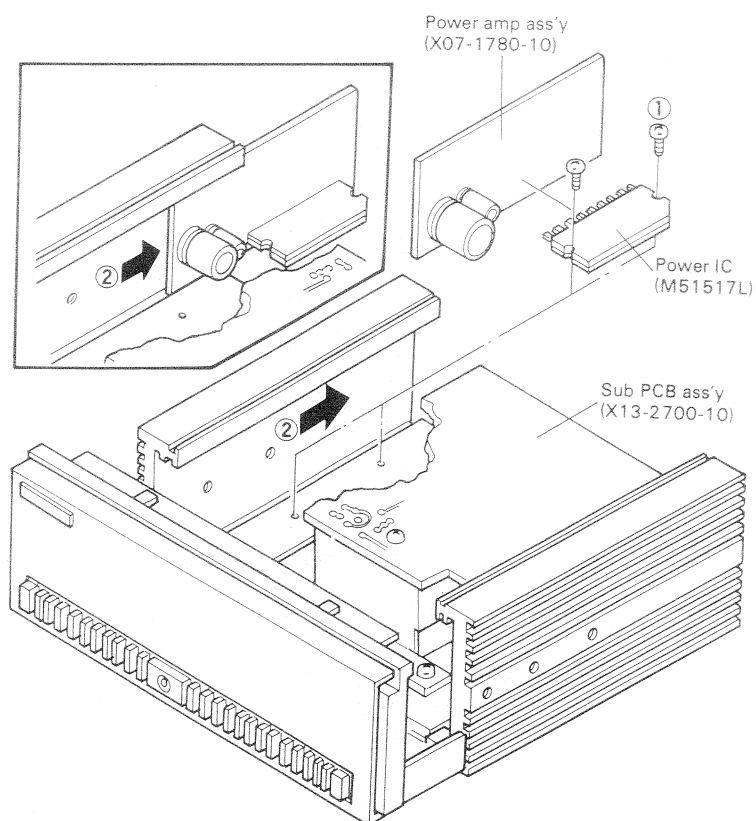


## POWER IC DISASSEMBLY

- ① Remove the two screws from the heat sink.
- ② Slide the power PCB ass'y backwards.

## CAUTION:

To avoid damaging the power IC by heat, apply the thermal compound to the back of the power IC.



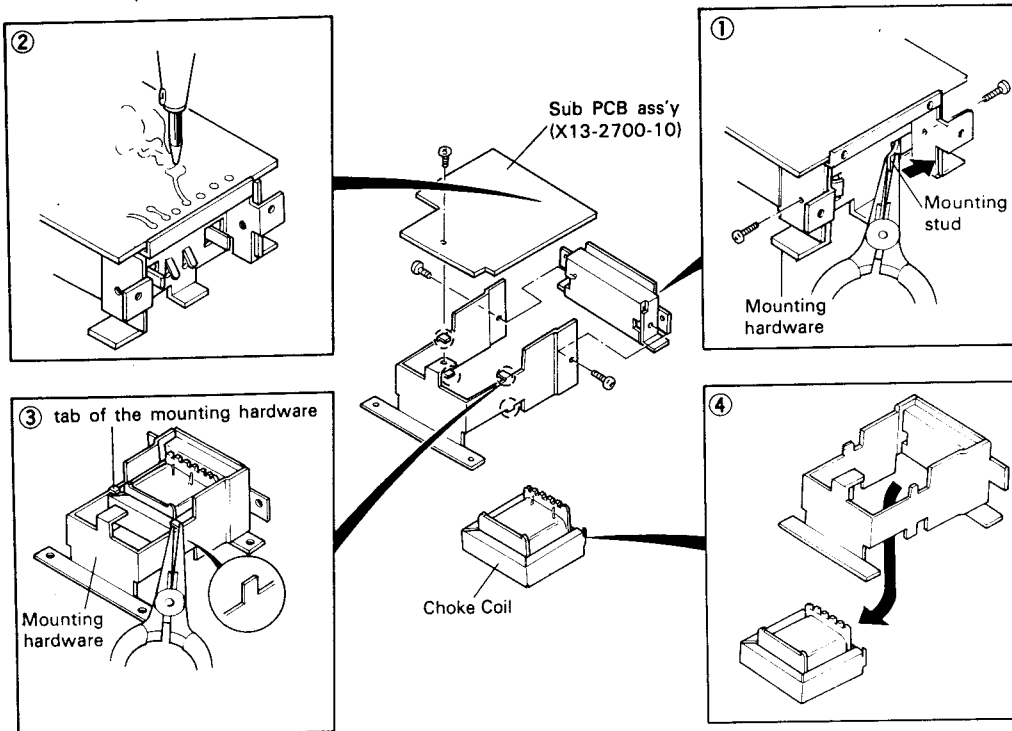
## DISASSEMBLY FOR REPAIR

### CHOKE COIL AND DIODE DISASSEMBLY

- ① Remove the two screws from the mounting hardware and spread the mounting stud of the choke coil.
- ② Unsolder the leads of the choke coil. Remove the screw from the Sub PCB ass'y and remove the PCB ass'y.

When replacing or removing the diode (D1), the following procedures are not necessary.

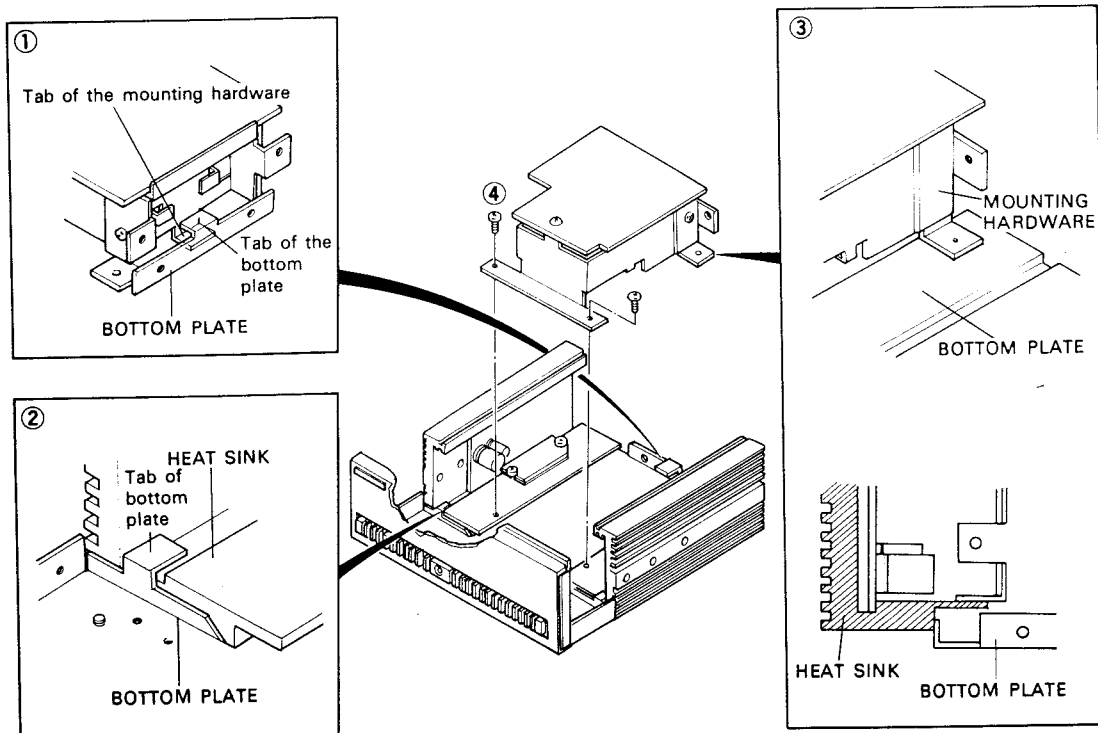
- ③ Set up the tab of the mounting hardware.
- ④ Remove the choke coil.



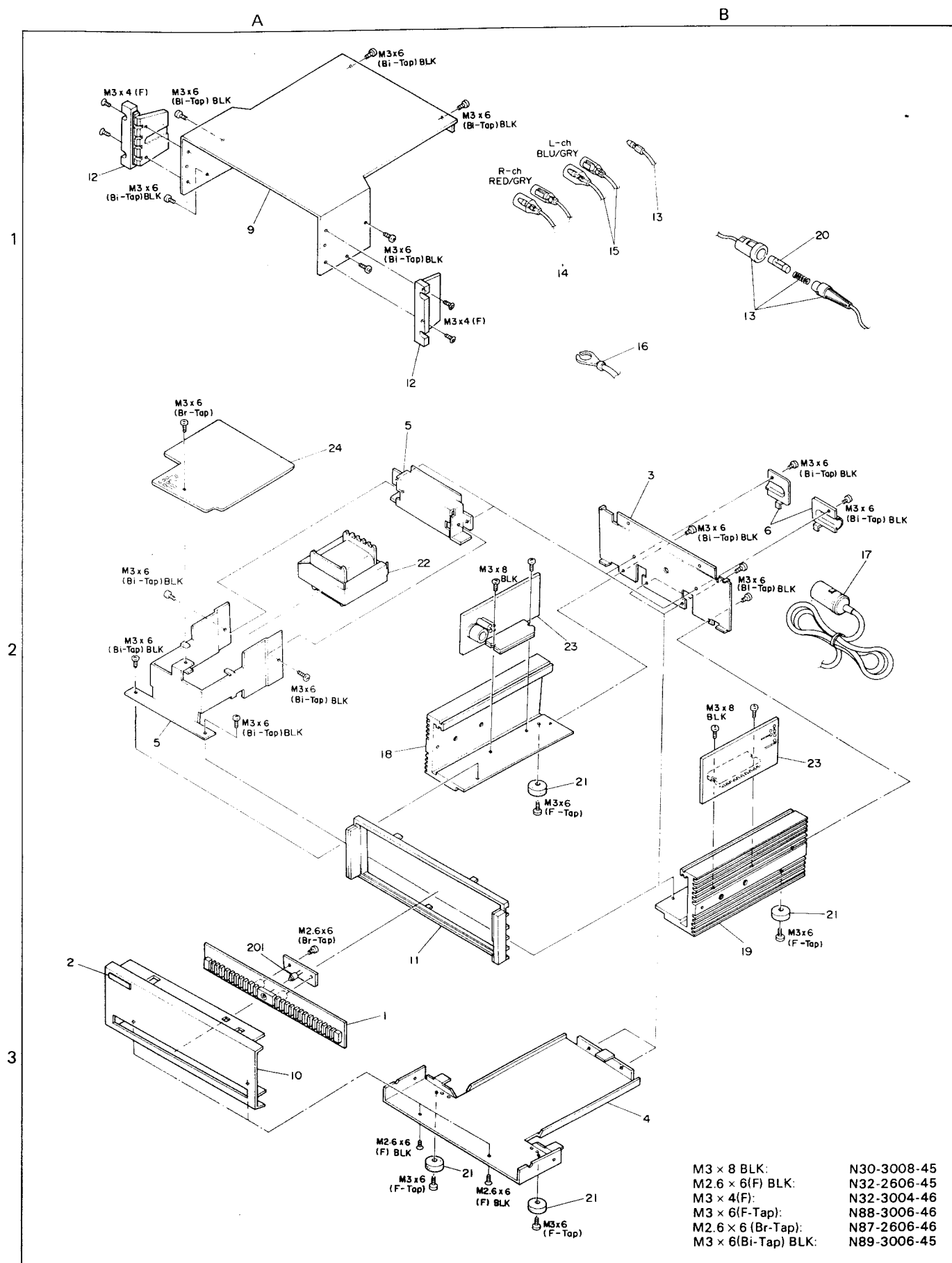
### ASSEMBLY

- ① Position the tab of the bottom plate above that of the mounting hardware.
- ② Insert the tab of the bottom plate to the slit of the heat sink.

- ③ Put the heat sink between the mounting hardware and the bottom plate.
- ④ Fasten the mounting hardware with the screws.

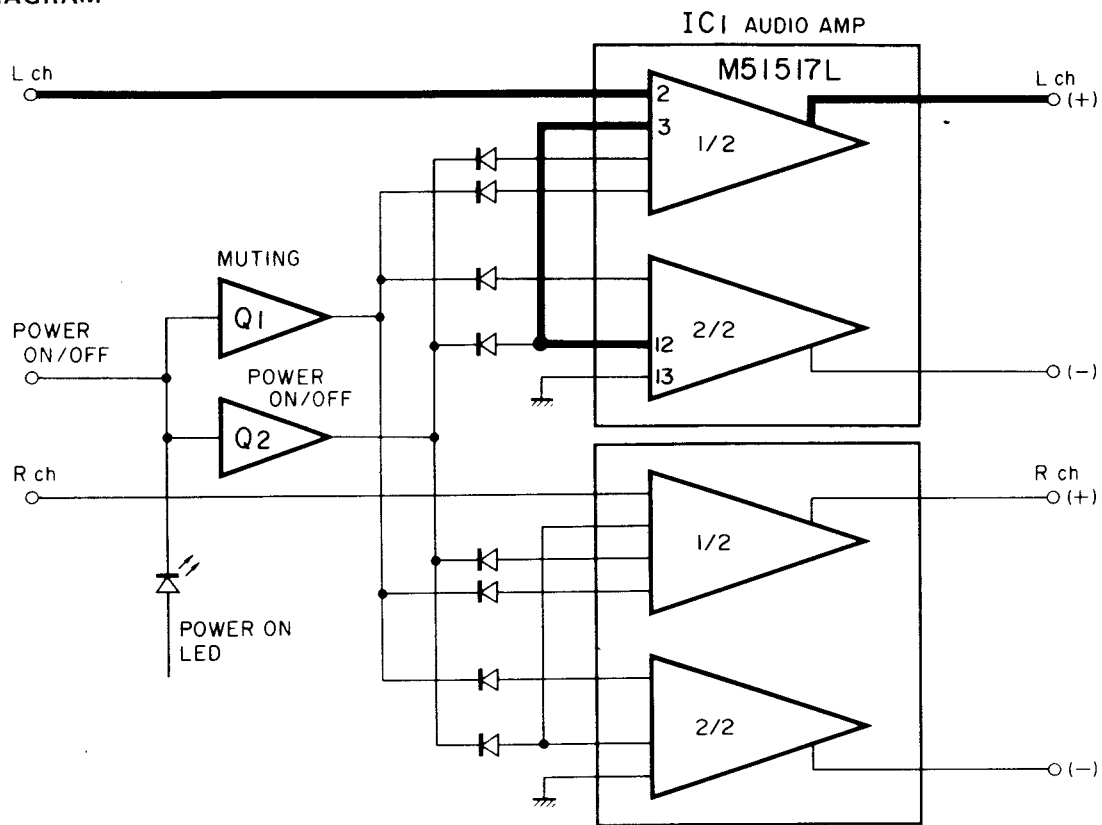


## EXPLODED VIEW

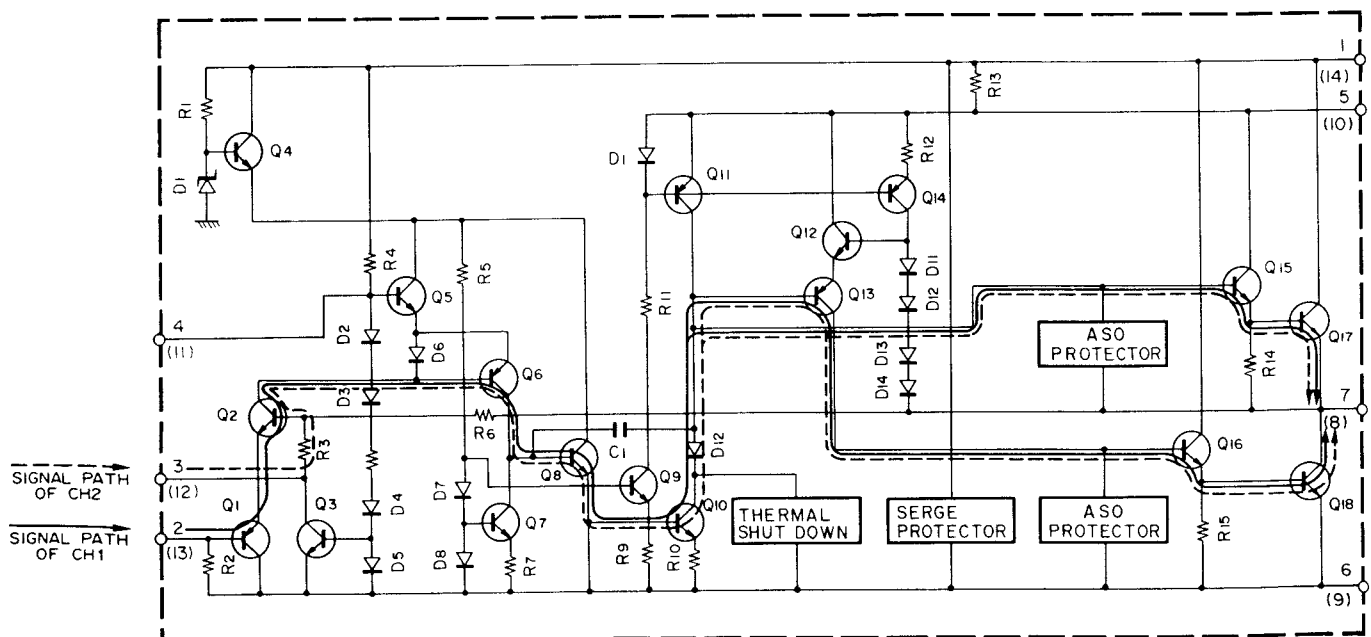


# BLOCK DIAGRAM/CIRCUIT DESCRIPTION

## BLOCK DIAGRAM



## CIRCUIT DESCRIPTION



<SCHEMATIC OF M51517L INTERNAL>

## CIRCUIT DESCRIPTION

This integrated circuit includes 2-channel amplifiers, as shown in the block diagram, and it can be used for stereo signal amplification as well as for monaural signal amplification in a BTL connection.

### Principle of BTL

The principle of the BTL connection is explained in the following. When the  $\oplus$  output terminals of channel 1 and inverted channel 2 are connected to the speaker, as shown in the figure below, a voltage twice the single channel output voltage is applied to the speaker, as listed in the table on the right. This is as if the power supply voltage is doubled. However, it must be noted that the speaker's  $\ominus$  terminal is not at the ground voltage level, and that has a voltage (floated) cannot be grounded. Grounding of this kind of  $\ominus$  or any speaker terminal means a short-circuit at the amplifier's output, and may cause damage to the integrated circuit.

### BTL connection for M51517L

The input signal for channel 1 is applied to input terminal 2, and the non-inverted output is obtained on terminal 3. For channel 2, when input terminal 13 is grounded and the input signal is applied to terminal 12, the inverted output is obtained on terminal 8. The BTL connection is made by connecting the terminal 3 to 12 and connecting a speaker between the terminals 7 and 8. The gain of channels 1 and 2 can be balanced when the resistor is inserted between the terminals 3 and 12.

### POWER ON/OFF CIRCUIT

(1) In the case of power OFF, the base of Power ON/OFF transistor Q2 is pulled down by a 10k $\Omega$  resistor R6, and Q2 turns ON. Then terminals 4 and 11 of the IC are pulled to a ground voltage level through diodes D1 and D2. Therefore, in the IC, Q5 connected to the terminal 4 is cut off, and the current is not supplied to Q6. Q8 is also cut off, then Q10 is cut off. Q13 is cut off since its

base voltage is +B, Q16 turned OFF with its base voltage at 0V, then Q18 is turned OFF. Finally, the +B voltage appears at terminal 7.

The base of the Muting transistor Q1 is 0V to cut off, and the emitter is approximately 0V. Then, terminals 3 and 12 of the integrated circuit are pulled to a ground voltage level through diodes D3 and D4. In the integrated circuit, the base voltage of Q2 is lowered to cut off both Q1 and Q2 and the muting function is operated.

(2) In the case of power ON, +B is applied to the base of Q2, and it is cut off. Diodes D1 and D2 are reverse biased, so that the integrated circuit is biased normally to bring it into operation. Meanwhile, a voltage from the RC delay circuit (R3 and C2) is applied to the base of Q1, and it turns ON after approx. 1.5 sec determined by the time constant. The emitter voltage, then, goes up to a +B voltage level. Diodes D3 and D4 are reversely biased, making the circuit open, and Muting is released. The discharging diode D3 in the muting circuit resets the circuit condition after the power is turned OFF, so that the muting time length of 1.5 sec is effective when the power is turned ON next.

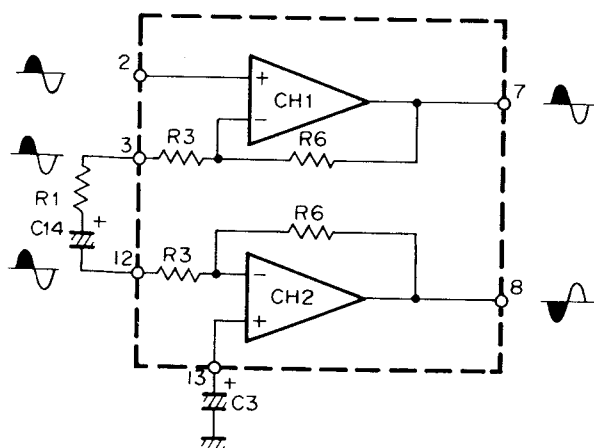
### OTHERS

The protection diode D1 mounted on SUB PC BOARD is to make a short-circuit to blow the fuse when the supply voltage is connected oppositely.

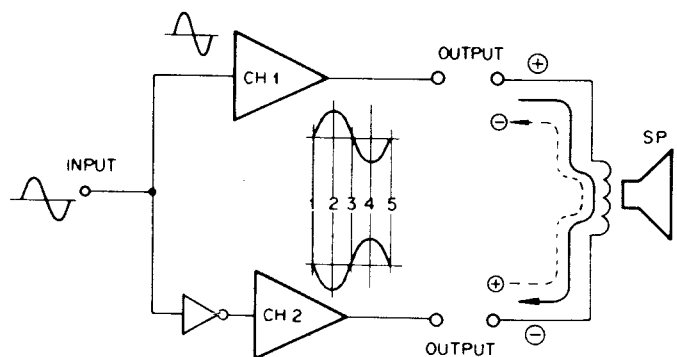
The choking coil protects the circuit from the external pulse noise such as the ignition noise.

### CAUTION:

This amplifier uses the BTL connected circuit as mentioned before, so make sure of the following. Since the ground line of the amplifier is floated, when connecting the measuring instruments (oscilloscope, VTVM, distortion meter, load resistors etc.), make sure to use the floated GND terminals. When their grounds are connected to the ground terminals of the power supply, oscillator, etc., the output of the M51517L will be short-circuited and IC may be damaged.



<SIMPLIFIED SCHEMATIC OF BTL CONNECTION>

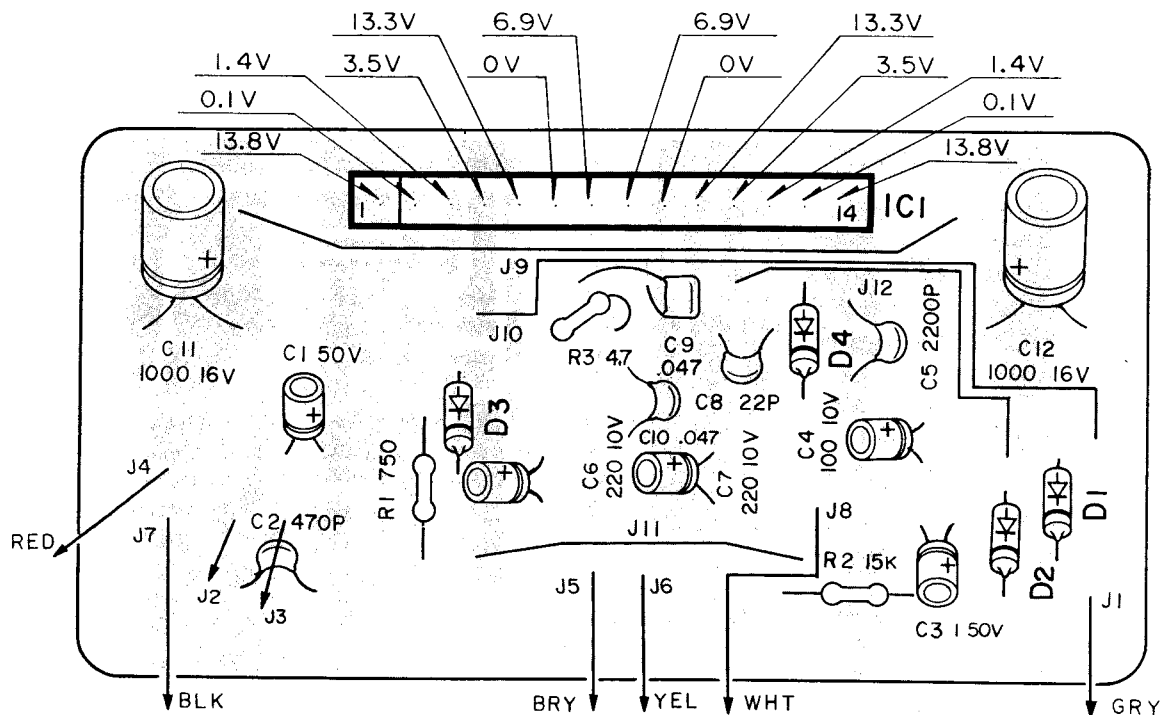


<BTL CONNECTION>

	1	2	3	4	5
CH1	0	+	0	-	0
CH2	0	-	0	+	0
Total	0	2 times	0	2 times	0

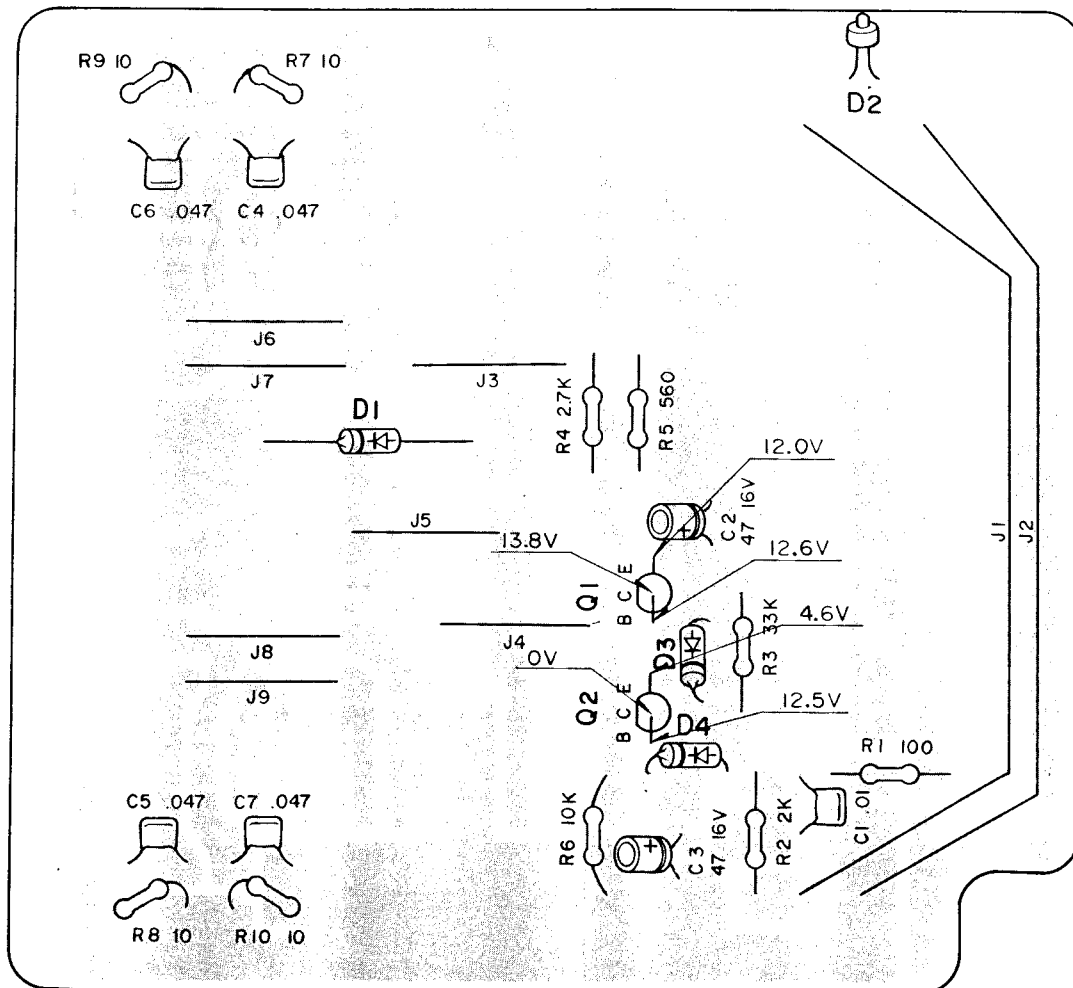
## PC BOARD

## POWER AMP (X07-1780-10) Components side view



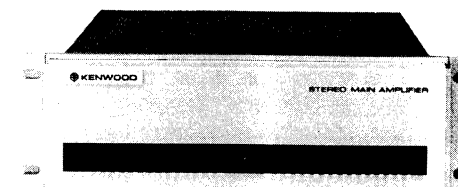
IC1: M51517L  
D1~4: 1S2076 or 1S1555

## SUB (X13-2700-10) Components side view



Q1: 2SC945 (Q.P) or 2SC2320 (E.F)  
Q2: 2SA733A (Q.P) or 2SA999 (E.F)  
D1: U05B  
D2: AR2133D  
D3,4: 1S2076





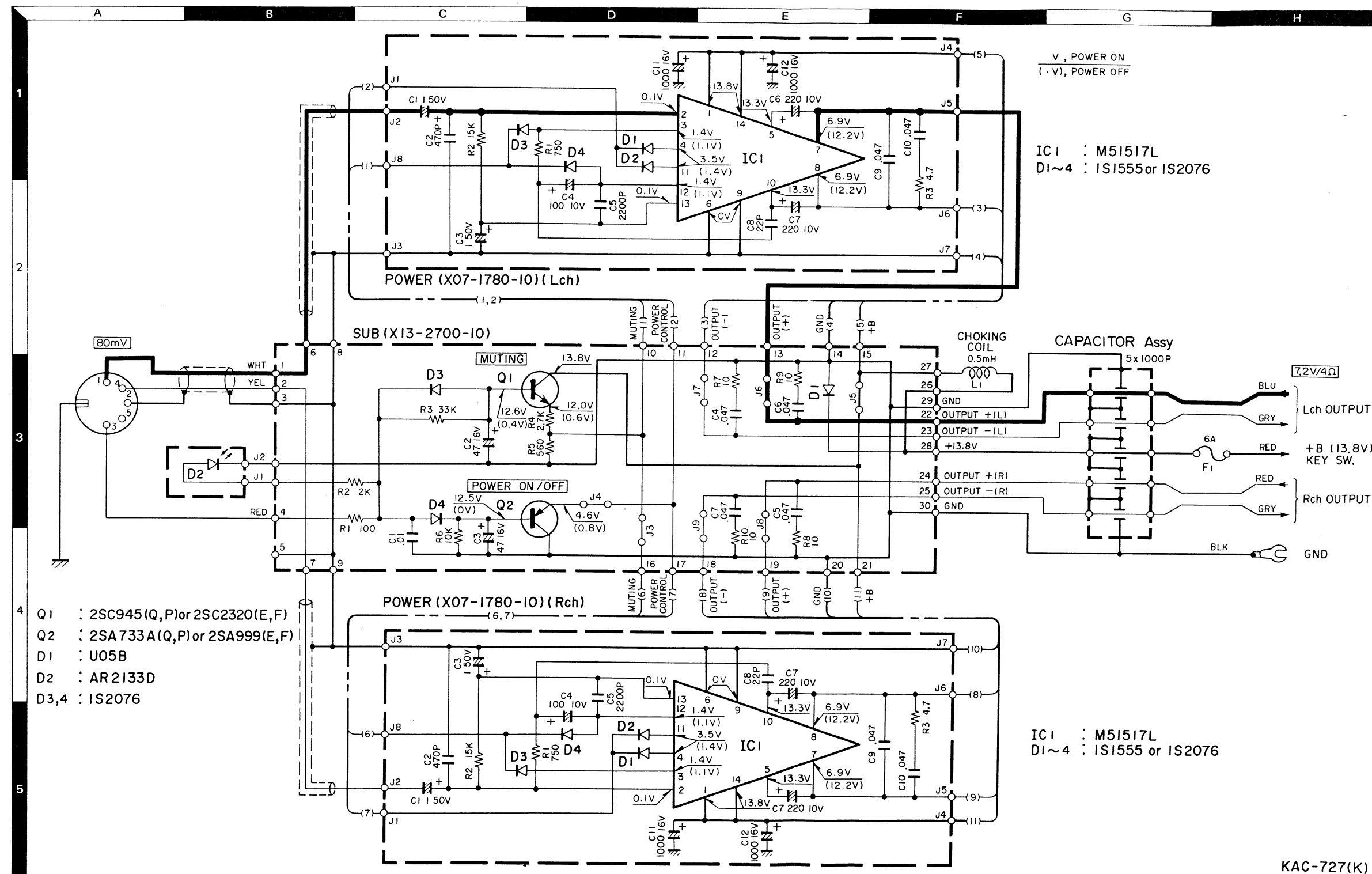
### SPECIFICATIONS

Total Power Output	40 watts
Power Output per Channel	20 watts
At 10% THD at 1 kHz/4 ohms	15 watts
At 1% THD at 1 kHz/4 ohms	20 Hz to 50 kHz
Power Bandwidth (1% THD)	0.06%
Distortion	20 Hz to 70 kHz
Frequency Response (-3 dB)	80 dB
Signal to Noise Ratio	100 mV/7 kohms
Input Level/Impedance	13.8V
Operating Voltage	4A
Current Consumption	170 x 54 x 165 mm
Dimensions (W x H x D)	(6-11/16" x 2-1/8" x 6-1/2")
Body Size (W x H x D)	150 x 50 x 150 mm
Weight	(5-15/16" x 2" x 5-15/16")
	1.1 kg
	(2.4 lbs)

Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.



DC voltages are measured by a VOM with 20kΩ/V input impedance.

## PARTS LIST

Ref. No.	Parts No.	Description	Remarks	
参照番号	部品番号	部品名 / 規格	備考 番号	
②				
①	18 1A	A01-0608-12	METALLIC CABINET	+
	19 2A	A20-1979-11	FRONT PANEL ASSY	+
	19 2A	A20-1979-11	FRONT PANEL ASSY	PM
	19 2A	A20-1979-11	FRONT PANEL ASSY	SU
	19 2A	A20-1979-11	FRONT PANEL ASSY	XW
⑤	R221	R43-1333-15	FL-PROOF RD330 J 2H	•
	R222	R43-1368-15	FL-PROOF RD680 J 2H	•
	VR1 2	R12-3301-05	TRIMMING POT. 20K(8)	•
	VR3 4	R19-4305-05	POTENTIOMETER (OUTPUT)	•
	VR5 6	R12-2302-05	TRIMMING POT. 5K(8)	•

- ① Exploded view drawing No.
- ② Position in exploded view.
- ③ Symbol of new parts
- ④ Area to which parts are shipped. Example: A20-1979-11 is the parts No. of FRONT PANEL ASS'Y for the "K" type products (for USA).  
When this column is blank, it means that the same type of parts (same parts No.) are used for the products shipped to all areas.
- ⑤ Reference No. in schematic diagram.
- ⑥ Abbreviation of "Flame proof metal oxide film resistor". All capacitors and resistors are listed using abbreviations.
- ⑦ Abbreviations

- |         |       |                                 |
|---------|-------|---------------------------------|
| ELECTRO | ..... | Electrolytic capacitor          |
| LL-ELEC | ..... | Low leak electrolytic capacitor |
| NP-ELEC | ..... | Non-pole electrolytic capacitor |
| MICA    | ..... | Mica capacitor                  |
| POLYSTY | ..... | Polystyrene capacitor           |
| MYLAR   | ..... | Mylar capacitor                 |
| CERAMIC | ..... | Ceramic capacitor               |
| TANTAL  | ..... | Tantalum capacitor              |
| MF      | ..... | Metallized film capacitor       |
| OIL     | ..... | Oil capacitor                   |
- The unit "UF" is used in lieu of "μF"

- |   |                                       |      |
|---|---------------------------------------|------|
| * Abbreviations of resistors (Parts No. with initial letters "R") |                                       |      |
| RC .....  | Carbon composition resistor           |      |
| RD .....  | Carbon film resistor                  |      |
| FL-PROOF RD .....   | Flame-proof carbon film resistor      |      |
| RW .....  | Wire wound power resistor             |      |
| FL-PROOF RS .....   | Flame-proof metal oxide film resistor |      |
| RN .....  | Metal film resistor                   |      |
| 2B .....  | Rated wattage                         | 1/8W |
| 2E .....  | Rated wattage                         | 1/4W |
| 2H .....  | Rated wattage                         | 1/2W |
| 3A .....  | Rated wattage                         | 1W   |
| 3D .....  | Rated wattage                         | 2W   |
| 3F .....  | Rated wattage                         | 3W   |
| 3G .....  | Rated wattage                         | 4W   |
| 3H .....  | Rated wattage                         | 5W   |

- \* Abbreviations common to capacitors and resistors.
- |   |                                    |
|---|------------------------------------|
| C | ±0.25pF (Used for capacitors only) |
| D | ±0.5pF (Used for capacitors only)  |
| F | ±1%                                |
| G | ±2%                                |
| J | ±5%                                |
| K | ±10%                               |
| M | ±20%                               |
| Z | +80%, -20% (Used for capacitors)   |
| P | +100%, -0% (Used for capacitors)   |

- ⑧ Resistors RD (carbon composition resistors) are not listed in the parts list. For values, refer to the schematic diagram.

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考
<b>KAC-727</b>			
1 3A	-	DRESSING PLATE	
2 3A	-	BADGE	
3 2B	-	REAR PANEL	
4 3B	-	BOTTOM PLATE	
5 2A	-	MOUNTING HARDWARE	
6 2B	-	HOLDER	
9 1A	A01-0371-03	METALLIC CABINET	
10 3A	A20-1592-03	FRONT PANEL ASSY	*
11 3A	B01-0161-02	PANEL ESCUTCHEON	
12 1A	B01-0162-03	PANEL ESCUTCHEON	
-	B46-0063-13	WARRANTY CARD	U
-	B46-0070-03	WARRANTY CARD	KU
-	B46-0071-03	WARRANTY CARD	P
-	B50-3106-00	INSTRUCTION MANUAL	*K
-	B50-3106-00	INSTRUCTION MANUAL	*U
-	B50-3107-00	INSTRUCTION MANUAL	*P
-	C91-0111-05	CAPACITOR ASSY 1000PFx5	*
13 1B	E30-0618-05	DC CORD	
14 1B	E30-0619-05	SPEAKER CORD	
15 1B	E30-0620-05	SPEAKER CORD	
16 1B	E30-0623-05	EARTH CORD	
17 2B	E30-0633-05	DIN CORD	
18 2A	F01-0340-04	HEAT SINK L	
19 2B	F01-0341-04	HEAT SINK R	
F1	F05-0021-05	FUSE 250V 6A FIG20	
-	H01-3115-04	CARTON BOX	*K
-	H01-3115-04	CARTON BOX	*U
-	H01-3116-04	CARTON BOX	*P
-	H10-1545-03	POLYSTYRENE FIXTURE	
-	H25-0067-03	BAG	
-	H25-0112-04	BAG	
-	H25-0162-04	BAG	
21 2B	J02-0108-04	FOOT	
21 3A, 3B	J02-0108-04	FOOT	
L1	L15-0018-05	CHOCK COIL FIG22	
-	N99-0024-05	SCREW NUT SET	*
23 2B	X07-1780-10	POWER AMP PCB ASSY	
24 2A	X13-2700-10	SUB PCB ASSY	
<b>POWER AMP (X07-1780-10)</b>			
C1 ,3	C24-1710-59	ELECTRO 1UF 50WV	
C2	C52-1747-16	CERAMIC 470PF K	
C4	C24-1010-79	ELECTRO 100UF 10WV	
C5	C45-1722-25	MYLAR 0.0022UF J	
C6 ,7	C24-1022-79	ELECTRO 220UF 10WV	
C8	C71-1722-06	CERAMIC 22PF J	
C9 ,10	C55-1747-38	MYLAR 0.047UF K	
C11 ,12	C90-0817-05	ELECTRO 1000UF 16WV	
D1 -4	V11-0076-05	1s1555	
IC1	V30-0436-10	M51517L	
<b>SUB (X13-2700-10)</b>			
D2	B30-0218-05	AR2133D FIG201	
C1	C55-1710-38	CERAMIC 0.01UF Z	
C2 ,3	C24-1047-69	ELECTRO 47UF 16WV	

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考
C4 -7	C45-1747-36	MYLAR 0.047UF J	
D1	V11-0270-05	U05B	
D3 ,4	V11-0271-05	1S2076	
Q1	V03-0270-05	2SC945(Q,P)2SC2320(E,F)	
Q2	V01-0733-40	2SA733(A)(Q,P),2SA999	